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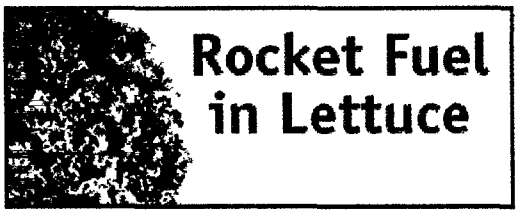

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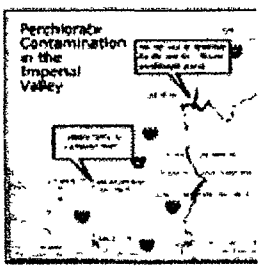
High Levels of Toxic Rocket Fuel Found Lettuce

Summary

Eating lettuce or other vegetables grown in fields irrigated by the Colo may expose consumers to a larger dose of toxic rocket fuel than is co safe by the U.S. Environmental Protection Agency, according to test d documents obtained by Environmental Working Group (EWG).



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Test results never before made public show that leafy vegetables grown with contaminated irrigation water take up, store and concentrate potentially harmful levels of perchlorate, a thyroid toxin that is the explosive main ingredient of rocket and missile fuel.

Sworn depositions and other courtroom documents show that the giant aerospace and defense contractor Lockheed Martin — a major user of perchlorate responsible for widespread contamination of Southern California water supplies — knew as early as 1997 that vegetables stc concentrations of the chemical, but said nothing to the EPA or state h officials. [PDF documents: Lockheed letter | Test results] Since most related work by defense contractors is done for the U.S. military, the of Defense may also have known, but said nothing to warn other ager consumers — or farmers whose crops, through no fault of their own, tainted by contaminated irrigation water.

If the perchlorate levels reported here are confirmed by further testin immediate government action will be needed to reduce perchlorate in other vegetables. In the interim, we strongly recommend that the Foc Administration immediately begin testing lettuce and selected other v grown with Colorado River water for perchlorate, and that the results testing be made public as soon as they are confirmed.

In addition, any grower who is adversely affected by perchlorate cont of their crops should be fully compensated for any and all economic lc their farming operations and property values.

Perchlorate in food could threaten human health

In a front-page story on Dec. 16, 2002, *The Wall Street Journal* repor "tests on several vegetable samples from a perchlorate-contaminated Redlands found the plants concentrated perchlorate from local irrigati an average factor of 65, according to calculations by Renee Sharp of t Environmental Working Group in Oakland, Calif., one of the few nonpı focused on perchlorate contamination. That means the perchlorate do vegetables was 65 times the amount in the water." Sharp told the Jou people are eating it, on top of drinking it, the EPA will have to lower it drinking-water standard substantially." [Read the story]

Perchlorate, which impairs the thyroid's ability to take up iodide and p hormones critical to proper fetal and infant brain development, has cc almost 300 drinking water sources and farm wells in California and ar number of sources in at least fifteen other states. Sources known to b contaminated include the Colorado River from near Las Vegas to the I border — the primary or sole source of irrigation water for farms in C Arizona and Nevada that grow the great majority of the lettuce sold ir during winter months.

If the perchlorate concentrations shown in the test results obtained b cited by the Journal affect the entire Colorado River winter vegetable

would have huge implications for current efforts to set safety standar exposure to perchlorate. It would signal that decades of negligence b manufacturers, the aerospace industry and the U.S. military have con not only the drinking water of millions of Americans, but their food su well.

Both the EPA and the state of California are working toward establishi standards for perchlorate in drinking water. Under state law, Californi supposed to set a standard by January 2004, although progress has b delayed by a lawsuit filed by St. Louis-based Lockheed Martin and Ke Corp. of Oklahoma City, which until 1998 manufactured the chemical closed plant near Las Vegas that is a main source of contamination of Colorado River. (The sole remaining U.S. producer of perchlorate is A Pacific Corp. of Las Vegas; until 1988 its plant, now in Cedar City, Ut Kerr-McGee's in Nevada.) EPA says it doesn't plan to adopt national s perchlorate in drinking water until at least 2006, although both local a elected officials in California — where more contaminated sources are almost weekly — are calling for faster federal action.

But the newly revealed test data suggest that vegetables from the Im Valley region of California and Arizona, which produces most of the n lettuce sold nationwide from November to March, may be a more sign source of perchlorate exposure than drinking water.

In a 1999 study, the EPA's National Environmental Research Lab grew seedlings in perchlorate-contaminated water and found that "perchlor accumulated in the leaves to significant levels" — by factors of 100 t more. (Susarla et al. 1999.) The tests showed that lettuce was able t and store 95 percent of the perchlorate in the water. This extraordina rate of bioaccumulation would mean that lettuce grown in water with levels of perchlorate could deliver large doses of the toxin to consume far higher than the EPA's provisional drinking water standard.

But EPA discounted the results of the 1999 tests because the water u contaminated with concentrations of perchlorate much higher than ar found in water supplies, and because the lettuce seedlings were grow greenhouses and harvested before maturity. Despite the troubling re preliminary study and the absence of data on perchlorate in U.S. or i produce, the EPA concluded that "the available information . . . sugge foods do not contribute to" perchlorate accumulation in the human bo 2002, Bacchus et al. 1999.)

To close the data gaps, in April 1999 the EPA convened an "eco-sumn attendees included the Air Force; a coalition of perchlorate manufactu users, including Lockheed Martin, called the Perchlorate Study Group; Indian tribes who are major producers of winter vegetables irrigated Colorado River. The year before, at a perchlorate forum in Henderson environmental manager for the Yuma, Ariz., Quechan tribe stated:

> "Irrigation is a way of life for our people. We have 13,000 acres dedicated to the production of lettuce. We produce annually eig heads of lettuce for every man, woman and child [in the United States]. That food is produced from Colorado River water and 2 million people derive their water supply from the lower Colorado River in three states and two countries. That's how big this prob is." (Rogers 1998.)

At the "eco-summit," top priority was given to a "real-world" study th test a variety of crops through the Department of Agriculture, and the Department of Defense provided $650,000 to fund it and other studie USDA and the Food and Drug Administration developed an extensive the study — before deciding it was too expensive and postponing it in

Instead, the Air Force decided it would pay for a second study of gree grown lettuce. The findings of this second study have never been mad 2000, responding to a Freedom of Information Act request by a Califo interest law firm for "All materials related to any investigation or rese conducted by, or for, any U.S. Government Agency, regarding the he of perchlorate on humans beings and the environment," the Air Force some material, but nothing on either of the lettuce studies. The Air Fc

that those and other records "are fully exempt from disclosure until th sponsored EPA peer review is complete. They contain information tha under the deliberative process privilege." The EPA-sponsored peer rev proposed perchlorate standards is now complete, but the lettuce stud unreleased.

In October 2002, at a water industry-sponsored perchlorate conferen Ontario, Calif., Air Force spokesman Dave Mattie was asked about the greenhouse lettuce study before a group that included regional EPA o Mattie replied that the study had been completed, but "someone walk with the data." When asked why the the "real world" study of vegetat with Colorado River water had been cancelled, Mattie again said it wa funds.

But in fact, unknown to the EPA, there had in fact been a "real world" lettuce grown with perchlorate-contaminated water in 1997 — two ye the "eco-summit" at which such a study had been made a priority. An Martin, a key member of the Perchlorate Study Group, was intimately its results. Since the Air Force has worked closely with Lockheed Mart other members of the Perchlorate Study Group on a number of perchl research projects — including unethical tests on human subjects — th military may have known of these earlier lettuce tests as well.

Lockheed Martin is responsible for polluting dozens of water supplies i Redlands area of San Bernardino County, Calif., with high levels of pe and other chemicals. A class action lawsuit has been brought against company by more than 800 residents of the area, who blame contami drinking water for a variety of health problems including cancer. Farm area are not irrigated by the Colorado River, but draw from wells that contaminated by perchlorate plumes from now-abandoned Lockheed i

Lawyers at Engstrom, Lipscomb and Lack in Los Angeles, who represe Redlands residents suing Lockheed Martin, learned that the company been in negotiation with Lucky Farms, a San Bernardino grower of let other vegetables, over contamination of the farm's water supply. The subpoenaed all materials from the negotiations, and have discovered Lockheed was sitting on startling evidence of vegetables' uptake and concentration of perchlorate.

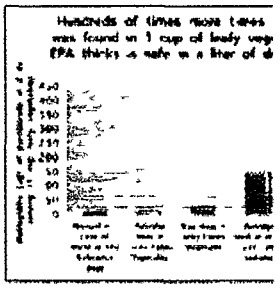
The subpoenaed documents, obtained by EWG from the lawyers, sho late 1997 and early 1998, Lucky Farms conducted a series of tests on to see if they were contaminated with perchlorate. [PDF documents: l letter | Test results] These tests were conducted on four samples of " vegetables" and four samples of some kind of "vegetable matter" whi identified.

The results of the testing were dramatic: The four "leafy vegetable" s averaged 4,490 micrograms of perchlorate per kilogram (ug/kg), with maximum concentration of 6,900 ug/kg. Perchlorate levels in the "veg matter" were lower, averaging 213 ug/kg with a high of 420 ug/kg. O vegetables were found to have an average of more than 2,600 microg perchlorate per kilogram — thousands of times higher than what the i considers to be a safe amount in a liter of water. Although there is cu federal drinking water standard for perchlorate, the EPA's proposed "r dose," which is what the agency considers the level that is safe to cor day, is just one microgram per liter of water or two micrograms per d adult.

Despite the startling results, Lucky Farms was somehow persuaded n legal action against Lockheed Martin. However, there was one signific Since at least 1995, farm workers living and working on Lucky Farms were required to sign a form stating that they had been warned of the drinking irrigation water. [View document] But after perchlorate was f water (and vegetables) in 1997, the forms were amended to include a specific warning: "This water may cause cancer or birth defects."

According to EWG's analysis, if a pregnant woman were to eat a typic of vegetables with the contamination level found at Lucky Farms, she a dose of rocket fuel more than 100 times higher than the EPA consid a liter of drinking water. (Figure 1.) One sample of "leafy vegetables" 386 micrograms of perchlorate per one-cup serving, and the average

perchlorate in the vegetable samples was 146 micrograms per two-ou serving.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According to other documents acquired by Engstrom, Lipscomb and Lack, the perchlorate concentration found in the five wells on Lucky Farms' property ranged from 10 to 130 parts per billion (ppb) and averaged 40.1 ppb. Because it is not known which wells were used to irrigate which samples it is difficult to calculate exactly how much each of the tested vegetables concentrated perchlorate, but using average figures for the amount of perchlorate found in the wells and the vegetables, EWG analysis shows that the vegetables concentrated perchlorate by a fact This means that perchlorate levels in the vegetables were on average higher than the levels in the water.

Such results are consistent with the high concentrations of perchlorat been found in non-crop plants growing in contaminated areas. (EPA 2 the data has profound implications for future perchlorate drinking wat standards — as well as for anyone who eats Imperial Valley lettuce.

The lower Colorado River is used to irrigate an estimated 1.46 million farmland in California and Arizona. Water is distributed from the Colo to the nearby Imperial Valley of California and southwestern Arizona v extensive irrigation canals. It is used to grow a variety of crops includ alfalfa, lettuce, wheat, citrus, barley, melons, dates, grapes, avocado tomatoes, onions, carrots and cauliflower. (CRWUA 2002.)

Of particular concern for perchlorate accumulation is a high water con like lettuce (which requires three acre-feet of water per acre). In Imp County, CA, 20,000 acres of iceberg lettuce and 10,500 acres of leaf l harvested in 1999. (Imperial County 2002.) That year, 45,000 acres c wintertime head lettuce, 5,300 acres of leaf lettuce and 9,300 acres o lettuce were harvested in Yuma County, AZ. (UA Extension 2002.)

EPA and the state of California are in the process of developing drinki standards for perchlorate, and both are required to consider sources c other than drinking water. The preliminary research on vegetable upt perchlorate strongly suggests that food is likely to be an equal or gre for perchlorate, but so far this hasn't been reflected in the proposed d water standards of either agency.

California's latest draft public health goal (PHG) of 2 to 6 parts per bil assumes that 80 percent of a person's exposure to perchlorate comes drinking water. (OEHHA 2002.) EPA has calculated a "drinking water e level" of 1 ppb for their most recent proposed reference dose (RfD), b yet considered the issue of relative source contribution in calculations proposed drinking water standard. (EPA 2002.) If vegetables irrigated Colorado River water are in fact concentrating perchlorate, the drinkir standards will have to be substantially lower to account for the consid exposure coming from food.

If Lockheed-Martin's perchlorate is indeed contaminating crops to uns FDA will have to take emergency action to keep the food off the mark growers will have to be compensated for damage to their farming ope property values.

Recommendations

If the perchlorate levels reported here are confirmed by further testin immediate government action will be needed to reduce perchlorate in other vegetables. In the interim, we recommend that the Food and Dr Administration begin immediately testing lettuce and selected other v grown with Colorado River water for perchlorate, and that the results testing be made public as soon as they are confirmed.

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